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REGION

Remedial Planning Activities At Selected Uncontrolled Disposal Sites

U.S. EPA Contract No. 68-W8-0089

Roy F. Weston, Inc.
Dames & Moore
Engineers International, Inc.
Life Systems, Inc.
Hubbell, Roth & Clark, Inc.
Reid, Quebe, Allison, Wilcox & Associates, Inc.
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TECHNICAL MEMORANDUM
ANALYSIS OF EXTENT OF CONTAMINATION
AND
ROD SELECTED REMEDY
AMERICAN CHEMICAL SERVICES SITE
GRIFFITH, INDIANA

June 1994

This document was prepared in accordance with U.S. EPA Contract No. 68-W8-0089, WESTON Region V Alternative Remedial Contracting Strategy (ARCS).

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Subject: Technical Memorandum
Analysis of Extent of Contamination and
ROD Selected Remedy
American Chemical Services Site

Dear Mr. Bolen:

Roy F. Weston, Inc. (Weston®) is submitting this Technical Memorandum which represents an analysis of the revised extent of contamination and the resultant cost impact on the selected remedy presented in the American Chemical Services (ACS) Record of Decision (ROD). This Technical Memorandum was prepared at the request of the United States Environmental Protection Agency (U.S. EPA) after additional data was submitted to the U.S. EPA following the approval of the ROD.

If you should have any questions, please contact us at our Vernon Hills, Illinois office at (708) 918-4000.

Very truly yours,

ROY F. WESTON, INC.

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SECTION 1
INTRODUCTION

Roy F. Weston, Inc. (Weston®) is submitting this Technical Memorandum which represents an analysis of the revised extent of contamination and the resultant cost impact on the selected remedy presented in the American Chemical Services (ACS) Record of Decision (ROD) (30 September 1992). This technical memorandum was prepared at the request of the United States Environmental Protection Agency (U.S. EPA) after additional investigative data from the ACS site was submitted to the U.S. EPA following the approval of the ROD.

Section 2 of this document discusses the site background. Section 3 discusses the selected remedy. Section 4 analyzes the extent of contamination and ROD cost estimate and presents an independent cost estimate. Section 5 presents the conclusions of this Technical Memorandum.

SECTION 2
SITE BACKGROUND

2.1 SITE DESCRIPTION

The ACS site is located at 420 South Colfax Avenue in Griffith, Indiana. The ACS site consists of the 19-acre ACS property, the 2-acre Pazmey Corporation property (formerly Kapica Drum, Inc., now owned by Darija Djurovic) and the inactive 15-acre portion of the Griffith Municipal Landfill.

Several areas of waste disposal have been identified at the ACS site and are designated as: the On-Site Containment Area, the Still Bottoms Area, Treatment Lagoon #1, the Off-Site Containment Area, and the Kapica-Pazmey Area. The Chesapeake and Ohio railway bisects the site in a northwest-southeast direction between the fenced On-Site Containment Area and the Off-Site Containment Area. The ACS site is situated in a predominantly residential and industrial area.

2.2 SITE HISTORY

ACS began operations as a solvent recovery facility in May 1955. Small batches of specialty chemicals were first manufactured at ACS in the 1960s; however, solvent recovery remained the principal operation throughout the history.

Still bottoms from the solvent recovery process were originally disposed of in the Still Bottoms Pond and Treatment Lagoon #1, which were both taken out of service in 1972. At that time, these two areas were drained and filled in with drums that were partially full with sludge materials.

Between 1958 and 1975, the Off-Site Containment Area was utilized as a waste disposal area. A variety of wastes were disposed of in this area, including the still bottoms from the

On 20 January 1994, representatives of Weston and Warzyn met to discuss the ACS site regarding the rationale used for generating the contaminated waste and soil volume estimates, and site remediation cost estimates. Warzyn prepared the RI Report, the FS Report and the Supplemental Soil Sampling Report for the ACS site on behalf of the Steering Committee for the ACS Potential Responsible Party (PRP) group. Weston also met separately with U.S. EPA during preparation of this report.

SECTION 3
RECORD OF DECISION SUMMARY

The U.S. EPA signed the ROD for the ACS site on 30 September 1992. The remedy addresses contaminated media at the ACS site including buried drums, buried wastes, contaminated soil and debris, and contaminated groundwater. The purpose of the remedy is to restore the contaminated property to an acceptable level that will allow unrestricted use of the property. Risk-based cleanup objectives included in the ROD will allow future residential use of the property. However, groundwater use at the site may be restricted. Groundwater use restrictions off site also may be necessary until the contaminant plume is verified to be contained within the site boundaries. For the purpose of this Technical Memorandum, the discussion will focus on buried drums, buried wastes, and contaminated soil and debris. Figure 3-1 illustrates the waste remediation flowchart. Several of the major provisions of the ROD are discussed below.

The ROD presents a remedy for treatment of buried wastes, contaminated soil, and PCB-contaminated soil. Buried waste is defined in the ROD as materials contaminated with VOCs at concentrations greater than 10,000 ppm; contaminated soil is defined as soil contaminated with less than 10,000 ppm VOCs and/or soil contaminated with compounds that exceed the cleanup objectives presented in the ROD; and PCB-contaminated soil is defined as soil that is contaminated with PCB concentrations of 10 ppm or greater.

The selected remedy is based on Alternative 6B in the FS Report. Alternative 6B states that an in situ vapor extraction (ISVE) pilot study may be conducted on buried waste in a portion of the On-Site Area and on contaminated soil on the ACS site. At the end of the performance period, sampling will be conducted to determine if ISVE will be effective and meet the cleanup objectives. If the ISVE system proves effective in meeting the cleanup objectives, then the majority of the buried waste (approximately 117,000 cubic yards [cy]) may be treated using ISVE. Regardless of the pilot study results, Low Temperature

Thermal Treatment (LTTT) will be implemented on an estimated 18,000 cy of buried waste in the Off-Site Area due to a large number of randomly distributed drums in that area.

If it is determined by U.S. EPA that ISVE is ineffective in achieving the cleanup objectives presented in the ROD, then all waste and contaminated soil will be excavated and treated by LTTT. As stated in the ROD, this scenario is similar to Alternative 7B in the FS Report. Alternative 7B states that 135,000 cy will be treated with LTTT.

In addition to the items discussed above, the ROD requires the following supplements:

- A groundwater pump and treat system will be installed to dewater the site and contain the contaminant plume. The treated groundwater will be discharged to surface waters and wetlands.

- LTTT residuals with PCB concentrations greater than 2 ppm will be disposed of off site at a Toxic Substances and Control Act (TSCA) landfill or incinerated. LTTT residuals with PCB concentrations less than 2 ppm can be backfilled on site. LTTT residuals with PCB concentrations less than 1 ppm can be used as cover material.

- Approximately 400 drums in the On-Site Containment Area will be incinerated off site.

- Heavy-metal contaminated soils and LTTT residuals with lead concentrations greater than 500 ppm lead will be sent off site for disposal.

- Miscellaneous debris will be disposed of off site.

- Condensate from the LTTT process will be properly treated and/or disposed of.

- Vapor emissions will be contained during excavation and ambient air monitoring will be required.

- The wetlands will be evaluated and monitored and if necessary, remediated.

- The long-term monitoring of groundwater.

- Private residential wells will be sampled and abandoned, if necessary.

- The surface of the site will be restored or capped.

SECTION 4

ANALYSIS OF EXTENT OF CONTAMINATION AND ROD COST ESTIMATE

Based on a review of the analytical data, a map was prepared that identifies and estimates the waste and PCB-contaminated soil areas (Figure 4-1). The map was digitized using Computer Aided Design (CAD) software, and the aereal extent of the remediation areas was calculated. The depth of contamination was estimated based on the analytical results of soil boring samples and auger probe observation at various depths. A volume estimate of 117,000 cy of buried waste and PCB contaminated soil, which includes a 1.3 bulking factor, has been estimated for by Weston. A volume estimate by area is included as Attachment A. Table 4-1 lists the soil samples collected during the RI and supplemental soil field investigations that exceeded the PCB and VOC criteria.

Due to the low volatility of PCBs, ISVE would not be effective in treating PCB-contaminated soil. However, PCB-contaminated soil may effectively be treated by LTTT. ISVE would also likely not be effective in treating buried waste. Particularly buried waste that is contained in drums and/or contains semivolatile organic compounds (SVOCs). Buried waste may also be effectively treated by LTTT. Based on discussions with Warzyn, a LTTT treatability study has indicated that the treatment standards presented in the ROD can be met.

The ROD establishes cleanup objectives for semivolatile organic compounds (SVOCs), and VOCs. The ISVE treatment technology identified in the FS Report for treatment of contaminated soils that contain elevated concentrations of SVOCs will not be effective in treating SVOCs. However, a biologically enhanced ISVE (commonly referred to as bioventing), which utilizes biological treatment to enhance vapor extraction to treat soils in situ, may be a viable option. Biologically enhanced ISVE provides oxygen, nitrogen, and phosphorus to microorganisms in the soil. The microorganisms consume organics as a food source, gradually eliminating VOCs and SVOCs from the subsurface. A biologically enhanced ISVE treatability study conducted on contaminated soil from the ACS site

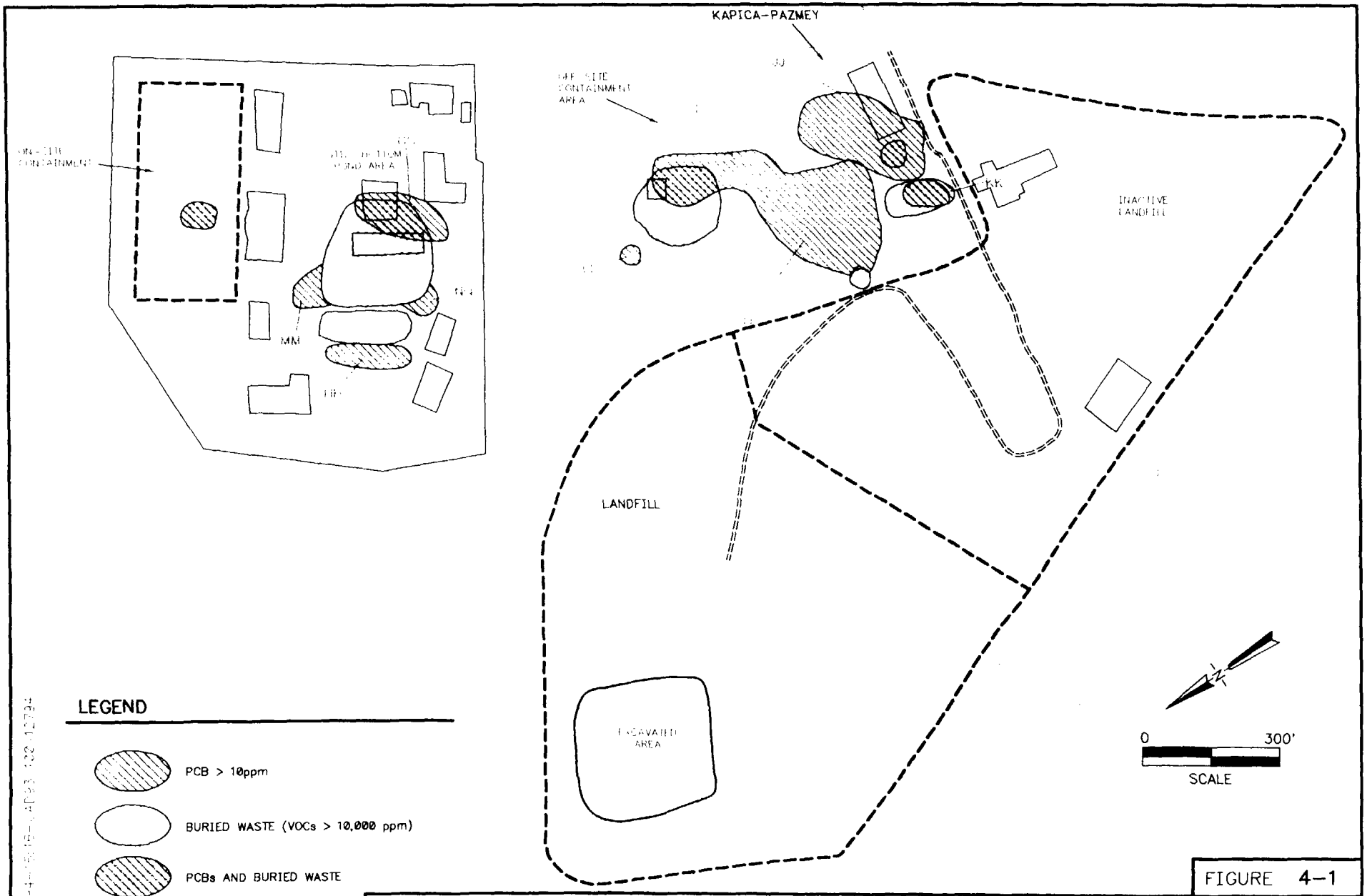

FIGURE 4-1

ALTERNATIVE REMEDIAL CONTRACTING STRATEGY
U.S. EPA CONTRACT No. 68-W8-0089
WORK ASSIGNMENT No. 19-5PU7
DOCUMENT CONTROL No. 4500-09 AIM

WASTE AND SOIL CONTAMINATION MAP
AMERICAN CHEMICAL SERVICES
Grifith, Indiana

Table 4-1

Soil Samples Exceeding Contaminated Soil and Waste Criteria
American Chemical Services
Griffith, Indiana

PCBs > 10 ppm								VOCs > 10,000 ppm		Lead > 500 ppm	
TP01-3.5	(JJ)	SB29-08	(II)	SB51-04.5	(KK)	SB91-5	(HH)	TP01-03.5	(FF)	TP01-3.5	(FF)
TP02-03	(AA)	SB30-10	(KK)	SB70-08	(GG)	SB92-3	(NN)	TP02-03	(AA)	TP02-03	(AA)
TP02-05	(AA)	SB35-17	(AA)	SB71-08	(GG)	SB93-3	(GG)	TP03-09	(CC)	TP03-09	(BB)
SB05-14	(II)	SB37-10	(II)	SB77-9	(II)			TP05-03	(BB)	TP06-04	(BB)
SB06-15	(II)	SB37-17	(II)	SB78-7	(II)			TP06-04	(BB)	SA01-03	(JJ)
SB07-19	(II)	SB40-10	(II)	SB81-6	(LL)			TP07-03	(BB)	SA02-03	(JJ)
SB10-05	(AA)	SA01-03	(JJ)	SB84-5	(JJ)			SB03-17	(CC)	SB02-07	(JJ)
SB17-06.5	(GG)	SA02-03	(JJ)	SB88-7.5	(JJ)			SB06-11.5	(CC)	SB05-14	(II)
SB18-07	(GG)	SB43-01	(JJ)	SB89-3	(MM)			SB07-14	(CC)	SB06-11.5	(CC)
SB22-12	(GG)	SB44-04.5	(JJ)	SB89-5	(MM)			SB24-12	(CC)	SB30-10	(DD)
SB25-11	(II)	SB45-01	(JJ)	SB90-3	(HH)			SB26-11	(BB)	SB15-13	(BB)
SB27-11	(II)	SB46-4.5	(JJ)	SB90-5	(HH)			SB30-10	(DD)		
SB28-08	(II)	SB48-01	(JJ)	SB91-3	(HH)			SB75-15	(BB)		

Note 1: SB18-07 refers to soil boring number 18 and a sample depth of 7 feet.
TP03-09 refers to test pit number 3 and a sample depth of 9 feet.

Note 2: The area shown in parentheses corresponds to the area shown on Figure 1.

- Lead-contaminated soil will be stabilized and landfilled at a nonhazardous waste landfill.
- When soil is excavated, it expands by a bulking factor of 1.3.
- The unit costs established in the ROD are accurate.

This cost estimate could change based on three requirements outlined in the ROD that would significantly impact the cost of remediation. The first requirement is that PCB-contaminated soil that fails to meet the 2 ppm treatment standard after treatment using LTTT should be disposed in a TSCA landfill. The second requirement is that contaminated soil that fails to meet the treatment standards after treatment using enhanced ISVE should be treated using LTTT. The third requirement is that all contaminated soil or buried waste that exceeds 500 ppm lead after treatment should be landfilled off site.

Another factor that could impact the cost of remediation is the unit cost for treatment using LTTT. Although the $300 per cubic yard unit cost appears reasonable for most applications, the unit cost could vary due to the treatment cost of the condensate. The number of passes through the LTTT unit and the residence time in the LTTT unit may also vary in order to meet cleanup objectives. This variance could also impact the unit cost.

Table 2 compares the cost estimate for Alternative 6B and Alternative 7B presented in the ROD, with Weston's estimate on a line-item-by-line-item basis.

SECTION 5
CONCLUSION

Weston's cost estimate is based on our best professional judgement that LTTT could successfully treat 117,000 cy of waste, and PCB-contaminated soil and biologically enhanced ISVE could successfully treat contaminated soil to achieve cleanup objectives. Based on the assumptions discussed herein and on the available information, Weston estimates that the remedy selected by the U.S. EPA in the 30 September 1992 ROD can be implemented for a cost of $69,775,000 with an estimate of accuracy of plus 50 percent to minus 30 percent.

Table 4-2
Comparative Analysis Cost Estimate
American Chemical Services
Griffith, Indiana

Capital Cost												
	USEPA ROD (ISVE/ LTTT Remedy)				USEPA ROD (Unsuccessful ISVE/ LTTT Remedy)				WESTON			
Direct Capital Cost Item	Unit	Quantity	Unit Cost	Cost	Unit	Quantity	Unit Cost	Revised Cost	Unit	Quantity	Unit Cost	Revised Cost
Surface Water Diversion	Lump sum	1		$200,000	Lump sum	1		$200,000	Lump sum	1		$200,000
Site Preparation	Lump sum	1		$525,000	Lump sum	1		$525,000	Lump sum	1		$525,000
Groundwater Extraction System	Wells	24		$500,000	Wells	24		$500,000	Wells	24		$500,000
Groundwater Treatment System	gpm	200		$1,200,000	gpm	200		$1,200,000	gpm	200		$1,200,000
Remove ACS Tank Farms	Lump sum	1		$150,000	Lump sum	1		$150,000	Lump sum	1		$150,000
Excavation of Drums	Drums	500		$50,000	Drums	500		$50,000	Drums	500		$50,000
Repack and Off-site Incineration of Drums	Drums	500		$350,000	Drums	500		$350,000	Drums	500		$350,000
Off-site Disposal of Drums/Misc. Debris	Lump sum	1		$1,000,000	Lump sum	1		$1,000,000	Lump sum	1		$1,000,000
Off-site Disposal of PCB Soil (RCRA/TSCA Landfill)	Cubic yards	1,000		$700,000	Cubic yards	1,000		$700,000	Cubic yards	0		$0
LTTT Treatability/Pilot Study	Lump sum	1		$200,000	Lump sum	1		$200,000	Lump sum	1		$200,000
Portable Building	Buildings	1		$168,000	Buildings	1		$168,000	Buildings	1		$168,000
On-site LTTT	Cubic yards	18,000	$300	$5,400,000	Cubic yards	135,000	$300	$40,500,000	Cubic yards	117,000	$300	$35,100,000
Surface Restoration or Capping	Lump sum			$525,000	Lump sum			$525,000	Lump sum	11 acres		$525,000
Off-site Disposal of Metal-contaminated Soil	Cubic yards	2,500	$250	$625,000	Cubic yards	2,500	$250	$625,000	Cubic yards	10,000	$250	$2,500,000
ISVE Pilot Study	Lump sum	2	$200,000	$400,000	Lump sum	2	$200,000	$400,000	Lump sum	1	$200,000	$200,000
ISVE	Systems	4	$200,000	$800,000					Cubic yards	180,000	$20	$3,600,000
TOTAL DIRECT CAPITAL COST EXCLUDING LTTT				$7,393,000				$6,598,000				$11,168,000
TOTAL LTTT COST				$5,400,000				$40,500,000				$35,100,000
TOTAL DIRECT CAPITAL COST				$12,793,000				$47,098,000				$46,268,000

Table 4-2
Comparative Analysis Cost Estimate
American Chemical Services
Griffith, Indiana
(Continued)

	USEPA ROD (ISVE/LTTT Remedy)		USEPA ROD (Unsuccessful ISVE/LTTT Remedy)		WESTON	
Indirect Capital Cost Item	% of Direct Excl. LTTT	Cost	% of Direct Excl. LTTT	Cost	% of Direct Excl. LTTT	Revised Cost
Mobilization	20%	$1,478,600	20%	$1,319,600	10%	$1,116,800
Health and Safety	20%	$1,478,600	20%	$1,319,600	5%	$558,400
Design Level Investigation	10%	$739,300	12%	$791,760	1%	$111,680
Engineering Design	10%	$739,300	12%	$791,760	1%	$111,680
Startup	10%	$739,300	12%	$791,760	5%	$558,400
Licenses/Permit Fees/Oversight	20%	$1,478,600	20%	$1,319,600	5%	$558,400
Scope Contingency	25%	$1,848,250	30%	$1,979,400	25%	$2,792,000
TOTAL INDIRECT CAPITAL COST		$8,501,950		$8,313,000		$5,807,000
TOTAL CAPITAL COST		$21,300,000		$55,411,000		$52,075,000

APPENDIX A

SOIL VOLUME CALCULATIONS

Soil Volume Calculations[1]
American Chemical Services
Griffith, Indiana
(Continued)

Area MM - PCBs (SB89)

$$0.12\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 5\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) = 889\ yds.^3$$

Area NN - PCBs (SB92)

$$0.065\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 5\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) = 481\ yds.^3$$

Still Bottom Pond Subtotal = 44,111 yds.[3]

Off-site Containment Area

Area CC - Waste (TP03, SB03, SB06, SB07, SB24)

$$0.67\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 20\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) = 19,852\ yds.^3$$

Area EE - Waste (Based on waste identified by auger probes)

$$0.040\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 5\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) = 296\ yds.^3$$

Soil Volume Calculations[1]
American Chemical Services
Griffith, Indiana
(Continued)

Area KK - PCBs (SB30, SB51)

$$0.14\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 10\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) = 2,074\ yds.^3$$

Area DD - Waste (SB30)

$$0.22\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 5\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) - 0.12\ in.^2 \left(\frac{200\ ft.}{1\ in.}\right)^2 x\ 5\ ft.\ deep \left(\frac{1\ yd.}{27\ ft.^3}\right) = 741\ yds.^3$$

Kapica Pazmey Subtotal = 10,341 yds.^{3}

Total = 89,859 yds.^{3}

Using 1.3 bulking factor

TOTAL EXCAVATED SOIL = 116,817 yds.^{3}

Note 1: The depth of contamination used in the calculations is equivalent to the depth or the next highest 5-foot interval. The results of auger probes was also used in determining the depth of contamination.

Note 2: An average depth of 5 feet was assumed for Area II, although the depth of PCB-only contaminated exceeded 5 feet in certain borings.